The Struggles of Women in Science

An Honors Thesis (HONRS 499)

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Abstract

Women have not always been welcome in scientific circles in all parts of the world. In previous centuries it was even believed that women were not capable of scientific thought without compromising their ability to reproduce. Italy was an exception to this idea. In the eighteenth century, Italian universities allowed and included women in scientific and mathematical courses and jobs. These women flourished in the fields and many even married and had several children, while continuing their careers. Due to differences between men and women in physical and psychological aspects, women have been treated with less respect or less confidence then men, and even excluded from certain careers. Some of the reasons behind the difference in treatment are due to cultural beliefs as well as myths and assumptions about females. Many of the myths have been discounted, but there are still those who believe that women are not capable of contributing to science in the same manner as men. In today's society, circumstances are much better and women have become more prevalent in scientific and mathematical areas, but situations are still not as equal as they could be. Overall, changes have been made within society and the areas of mathematics and science, but there are still more changes that need to be made for the improvement in the treatment of women in these areas.

I. *Introduction*

Women have not always been as prevalent in science as they are today. In the past, women were not always allowed to attend universities, let alone pursue a career in science. The idea that women were inferior to men was common, which led to many myths dealing with the ability of women to participate, or even succeed in science. Linda Jean Shepherd (1993) explained in her book that "biological determinists explained the paucity of women in science by reasoning that the inability to do science is biologically built into women. They argued that a woman's intellectual development would proceed only at great cost to reproductive development." More recently, people have suggested that if a woman marries and has a family, she will produce fewer scientific papers, which has also been disproved (Zuckerman et al, 1991). Several other myths existed that placed a strain on the ability of women to pursue an interest in science, but many of these myths were eventually overcome throughout the years.

The number of women participating in science has increased throughout the years. "The proportion of doctorates being awarded to women has been growing since 1960, particularly in the last 15 years. By 1985, 24% of doctoral degrees in science and engineering went to women as against just 7% in 1970" (Zuckerman et al, 1991). It has also been shown that women tend to favor social and life sciences rather than physical science and engineering (Zuckerman et al, 1991). Women have also been found to be less likely than men to work in industry, and more likely to work in educational institutions (Zuckerman et al, 1991). These different preferences have seemed to bring about ideas of inequalities in present day situations.

Women have further endured several types of difficulties in pursuing scientific careers. Women in some areas of the world were offered better opportunities in education or employment than others, and different historical time periods obviously affected women's opportunities

related to science. Women's styles have been critiqued and compared to men's, suggesting the ideas, values, and concepts important to women are inferior to those of men's. In several instances, these ideas have also been discounted, and the differences have been seen as a way to better understand science from different points of views.

The conditions for women in science have been altered over the past few centuries. Over this time period, women interested in science have faced many struggles in other parts of the world. The treatment of girls versus boys even in primary and secondary education has been shown to be unequal, which could lead to the differences in treatment seen in later education and employment. It has also been found that men and women approach problems and perform experiments in alternative ways. These alternative approaches are often seen as a disadvantage, but could be seen as a positive part of research. The difficulties faced by women have decreased in fairly recent years, but still require improvement. Myths, ideas, beliefs, and differences have led to struggles for women to succeed as scientists. Even though there have been improvements, further changes must be made to create more equal treatment of women.

II. *Scientific Women in Different Parts of the World*

Based on research done throughout separate areas of the world, it has been shown that differences exist in these areas of the world in the way in which women are treated, the jobs they hold, as well as the opportunities that they are given. Several articles discussed the women in Germany, European countries as a whole, Bologna, Lisbon, as well as Islamic women. These areas differed significantly in the area of women in science, in the past as well as in present day.

Michael Hagmann (1999) discussed some general information about women in science in Europe in his article "EU confronts gender gap." In Lisbon, unexpected results were shown in

regard to the number of women involved in science. It was found that close to "60% of assistant and associate professors and 30% of full professors...are female" at the University of Lisbon (Hagmann, 1999). These statistics are not commonly seen in other areas of Europe. Typically, in most areas of Europe is that the ratio of men to women tends to be near 20 to 1 (Hagmann, 1999). In Austria, Hagmann reported that only about 4% of full professors are women (Hagmann, 1999). In this article, a quote from Mary Osborn explained a possible reason for the low numbers of females involved in science in Europe. She stated that "women are not staying in science. They're not being promoted to the same level as their male colleagues" (Hagmann, 1999). This could explain why women are choosing not to be involved in the sciences. Because females are not treated the same as males are, they are discouraged from participating in the scientific activities.

Edelgard Bulmahn (1999) discussed statistics and details about women associated with science in Germany in the article "Women in science in Germany." She stated that "on average, only 9% of top research positions in the EU [European Union] are held by women, despite the fact that women now constitute 50% of first-degree students in many EU countries" (Bulmahn, 1999). This does not appear to be a positive statistic. The article further discussed Germany's government is trying to increase the number of women that are involved in scientific areas, "particularly in positions of leadership at higher education and research institution" (Bulmahn, 1999). Statistics from 1998 showed that 6% of full professors at German Universities were women, 4% of "leadership positions at German non-university research institutions were women, while about 14% of full professors in the United States and France were female" (Bulmahn, 1999). Because of these statistics, the German government started a new program. "Equal Opportunities for Women in Research and Higher Education, which starts in 2001, is designed to

help us reach our goal of 20% female professorships at German Universities by 2005," according to Bulmahn (1999).

In order to increase the number of females involved in research and higher, the German government created opportunities for women in research that were designed to assist the females in reaching leadership positions (Bulmahn, 1999). Other programs were also developed. "Strategic projects such as the Centre of Excellence Women and Science, an information resource providing international networking facilities and expert databases, are designed to bring about structural change and raise awareness" (Bulmahn, 1999). Overall, it seems that Germany is taking steps to increase the positions available to women and to help women reach higher positions in several ways. Bulmahn (1999) stated, "encouraging gender equality is essential for innovation and international competitiveness in education, science, and industry. Fair representation of women will help us broaden the basis of scientific questions, methods, and approaches; foster change; improve research quality; and bring about a fairer distribution of resources."

Another group of women which are not as prevalently seen in the area of science are those in the Islamic culture. Farkhonda Hassan (2000) discussed the presence of women in science in this culture in the article "Islamic women in science." An important aspect to remember is that "in many Muslim countries, gender-based discrimination, coupled with social and cultural barriers, limits access and participation of women in higher education" (Hassan, 2000). This would influence the opportunities that are available to women of this culture. It was explained that science is taught to both males and females at first, but males and females are then separated around the age of 15, so the "disciplines are then studied separately in the last two or three years of high school education" (Hassan, 2000).

The customs and biases that are present in this society decreases the number of females involved in the science classes in high school, the females are encouraged to learn about the arts and humanities (Hassan, 2000). The differences in enrollment of males and females seem to have several reasons. "There are various reasons for [the differences] related to gender stereotyping, misleading perceptions that science and technology are subjects more suitable for boys, and the failure of curricula to relate science and technology to the everyday life of women" (Hassan, 2000). It was also stated that "Muslim countries vary greatly in their culture, traditions, and social systems, and there is a wide range of attitudes toward educating women at the university level. In areas where women are accepted at the university level, they "tend preferentially to enroll in life sciences and chemistry, with far fewer studying physics, mathematics, and engineering," and this is mostly likely not due to discrimination (Hassan, 2000). This shows that the employment as well as educational differences between males and females in science could be related to ideas and customs that are held by the culture in which the person is a part of, and has learned from throughout his or her life.

Italy was much different in respect to the ideas and opportunities afforded to women. According to Maria Cieslak-Golonka and Bruno Morton (2000), in the eighteenth century, "most upper-class women learned what they knew about the world by attending salons- lectures, concerts, and discussions conducted in parlors of Europe's great houses. A university education was off limits to women almost everywhere in Europe- with one notable exception: Italy" (Golonka and Morton, 2000). It was further stated that the universities of Salerno, Bologna, Padua, and others in Italy, in areas such as literature, medicine, and natural sciences, women and men were considered equal (Golonka and Morton, 2000). Several women from this area and time period were highlighted in the article. Laura Bassi, who lived from 1711 to 1778 became

the "first woman to earn a doctor of philosophy degree, and she was the university's first female professor" (Golonka and Morton, 2000). In addition to her academic career, she also married and had twelve children, and gave annual lectures from 1746 until 1777 (Golonka and Morton, 2000). Another example is Anna Morandi Manzolini. She lived from 1716 until 1774, and was considered the "finest practitioner of artistic anatomy" and was further "cited as the first to make wax models of internal organs" (Golonka and Morton, 2000). She also was married and had six children. A third example is Maria Gaetana Agnesi, who lived from 1718 until 1799. She was described in the article as "a brilliant linguist, a talented mathematician, and a thoroughly reluctant scholar" (Golonka and Morton, 2000). A final example in the article was Maria Dalle Donne, who lived from 1778 until 1842. "In 1799, Dalle Donne presented her dissertation and took the exam that made her the first female doctorate in medicine. She passed *maxima cum laude*, with highest honors" and "brought some measure of democracy to the education of women" (Golonka and Morton, 2000). These women as well as many others are examples of what women can do when they are given an equal opportunity for success in the field of their choice, and examples of how Italy's views were different from the views of other European countries at that point in time.

Overall, women in Europe do not seem to be given an equal chance to succeed in science. In some of the areas, women were not always even allowed to attend a university. Because women are treated with less respect and confidence, they are probably not as willing to pursue a career in the sciences. Many women could see the struggles and lack of respect and promotions in their jobs faced by women who have pursued this goal and did not succeed, and use that as a reason to avoid science. If that occurs, the number of women participating in the sciences will

never increase. Some countries, such as Germany, are attempting to correct some of the problems that are faced by women involved in science, but it seems to be merely a beginning.

III. *How Women Have Changed Science*

Becoming a scientist is not always the same for men and women. Women have often faced several different attitudes and ideas towards their reasoning and ability to go into science. Some of the concepts behind the attitudes do not always seem realistic or true, but have still affected the ability of women to succeed in science. "Some researchers do not like working with women because they believe their natural hormonal fluctuations would skew the data" (Morse, 1995). Morse (1995) also suggested that women might have to go through more struggles in the educational system in the US. Many times the system does not encourage females to be interested in science. When they are employed, women are often not allowed to participate in the same roles as men, and are placed in more "support roles, such as analyzing data or doing limited fieldwork" (1995). Further, in many cases, "women are expected to give up enormous amounts of what have historically been important parts of their lives: family, community involvement, and other aspects of what were known as 'domestic arts'" (Morse, 1995). To further accent this idea, when a woman was pregnant, she would often lose her job, according to company policy (Morse, 1995). In addition to this, Morse (1995) explained that

> "after the child is born, Americans are in the unique cultural position of encouraging their mothers to leave them as soon as possible to return to work. The proven benefits of breast-feeding are played down and the nurturant bond between mother and infant is broken, in the best interests of the corporation."

These ideas show that females do not always receive the same encouragement or opportunities that males do, and this affects the success in the scientific field. Also, the ideas of companies do

not seem to be conducive to the roles that a female was once expected to play. It seems that a female is often forced to choose between what society thinks she should do and what she is interested in doing, when the two roles could occur simultaneously. These ideas also seem to create a contradiction. Women want to be treated equally, but they also want to be able to continue with the roles that have always been performed by females.

In her book, *Women Changing Science*, Morse described the results of a report that stated facts about differences between boys and girls. The report found that:

> "-girls receive significantly less teacher attention then boys
> -reports of sexual harassment of girls by boys are increasing
> -the gender gap in math is small and declining, but girls are still not pursuing math-related careers in proportion to boys
> -girls who went on to take some college math closed the wage gap with men in their fields
> -the gender gap in science hasn't declined and may be increasing
> -curricula commonly ignore or stereotype females
> -many standardized tests contain elements of sex bias" (1995).

In the book, Morse (1995) also stated "recommendations toward achievement of educational equity for girls." Some of these suggestions included: (1) several areas of the community working in conjunction to show that women are able to succeed in the fields of math and science, (2) primary and secondary schools as well as communities need to expose young girls to female role models in these fields, in addition to making career information and experience in these fields available, and (3) extracurricular programs should be developed in schools, creating a link between the schools and organizations that are involved in the areas of math and science.

Morse (1995) further explained that during the seventeenth and eighteenth centuries, science became more interesting to the upper classes, but women were not allowed to participate in colleges and universities in the United States and Europe until the 1880's. This continued, and in the 1920's women had begun to enter programs to earn PhD's (Morse, 1995). According to

Morse, from 1930 until 1960 the number of women involved in science dropped again. It is believed that it was due to the action of men trying to re-exclude women from science, as well as the increase in the number of men entering college after World War II, under the GI bill (Morse, 1995). Then, in 1964, the Civil Right's Act "barred discrimination on the basis of sex in education and employment" aided females in the 1970's to increase in number in the sciences again (Morse, 1995).

Many specific examples of differences between the styles and attitudes of men versus women have been evaluated by several authors. Mary Morse discussed this subject in her book, *Women Changing Science* and Linda Jean Shepherd discussed the topic in her book, *Lifting the Veil: The Feminine Face of Science*. An important idea is that research has not really focused on female issues. Because of this, "not all science has served the needs, nor met the expectations, of women" which could affect a woman's view of science (Morse, 1995). Some people believe that "humans exhibit genetically predetermined traits or temperaments based on inherent sexual, racial, even ethnic differences" (Morse, 1995). Many other sources have suggested that at one time, it was believed that women were not able to do science, or learn certain subjects, but Shepherd (1993) stated that "nothing in a woman's physical, psychological, or intellectual nature prohibits her from doing good science." Another important concept suggested by Shepherd (1993) is that women enjoy collaborating with other scientists in research, and because of this, it is often believed that women are "incapable of creative innovation." Shepherd also explained an important difference between men and women.

> "Women ask fewer and shorter questions. They are more likely to offer suggestions and ask questions to clarify or elicit more information (thus admitting their ignorance). Men, on the other hand, use questions to exhibit knowledge and negotiate status. They tend to preface their questions with statements, ask multiple questions, and follow up the speaker's answer with additional questions or comments" (Shepherd, 1993).

Further, many men feel that when a woman is not sure, she is weak, but "from another perspective, uncertainty gives freedom. Something that is uncertain cannot be controlled" (Shepherd, 1993), revealing the possibility of openness in research done by women.

The idea of marriage and pregnancy also brings out differences between men and women. With women the idea of marriage and having a career causes a conflict for many individuals (Morse, 1995). Women are often expected to stay home after marriage, or after starting a family, but "very few men will sacrifice their career goals so that their wives could benefit" (Morse, 1995).

According to Shepherd (1993), Carol Gilligan completed a study of the moral development of women. She found that "an ethic care and responsibility may be more natural to women than a hierarchical, rule-dominated ethic or rights." This shows yet another difference between the way that a woman may approach a situation and the way that a man may approach a situation. These differences are not always negative, and can sometimes improve the quality of an experiment. Intuition is another quality that is identified with females. Many times, "the term 'feminine intuition' has been used as a way to explain away women's ability to think. Based on the stereotypes of women ruled by instinct and emotion, the reasoning goes: women cannot think, therefore they must have used intuition to arrive at the right answer" (Shepherd, 1993). Another idea concerning the negative implications of intuition is that intuition is often seen as "mysterious and nonrational" (Shepherd, 1993). Along these same lines, emotions have often been used as a negative part of femininity, but can also be useful in science. "Emotions, desires, passions, attachments, and feelings have long been suspect in science as a source of bias" (Shepherd, 1993). This can sometimes occur, but emotions can also "balance the one-sidedness of science and make a positive contribution by:

-drawing attention to values and ethics
-helping to evaluate relevance and establish priorities
-motivating research by love of nature, rather than desire for control
-respecting nature, rather than using nature as a commodity
-considering the feelings of other people" (Shepherd, 1993).

This list shows that just because women are more apt to show their emotions, or allow their emotions to be a part of their scientific research, it does not mean that their research will be any less valuable, important, or true.

Another way in which a difference between men and women may improve an experiment is that women tend to "weave together the individual and community, the situation and the environment, the research and its consequences" while men tend to look more at "separation and autonomy" when doing research (Shepherd, 1993). This could be important because in many instances, the pieces of a whole do not always show what the functions of the whole may be (Shepherd, 1993). Along these same lines, masculine ideas tend to be more linear, and feminine tend to be more of a circular path. Females tend to look at the problem from all sides, and "see all of its relationships. By giving... an appreciation for the complexity of even the simplest atom, the Feminine can replace the arrogance of science with a sense of awe and humility" (Shepherd, 1993). When a more circular path is taken to solve a problem, often it causes the process to become important rather than just the end result (Shepherd, 1993). This reveals that the way in which a woman might approach a problem, even though different from the path a man may take, may be just as valuable, or even more valuable. Differences between the sexes should be seen as a way to help research expand or move in a direction not initially intended. Differences can be useful; they are not always destructive in the area of scientific research. If they are used to the advantage of research and not disregarded as unimportant, or the reason that one sex is better than the other is, the differences can be an advantage.

IV. *Difficulties Faces By Women*

In the seventeenth century, women did not seem to be thought of very highly. A classic example of the low esteem and limitations placed on the value of women's contributions by men of that time period was presented in The *Scientific Lady: A Social History of Women's Scientific Interests 1520-1918* by Patricia Phillips. The overall view of women can be stated as follows:

> "the female mind, being deficient in rational powers, was unfit for the necessary mental effort required to study the classics. Nor was it necessary that women be so stretched since their sphere of activity was firmly circumscribed within the kitchen, sickroom and nursery, where skills of a manual and practical nature were all that was required" (1990).

Because of this concept, it was believed that women were easy to corrupt and that they should be protected from classical writers (Phillips, 1990). In the middle seventeenth century, women studied science, probably because they were not supposed to study the classics (Phillips, 1990). It was explained that science was advantageous for two reasons. "It was a study that demanded serious attention, and yet the student needed no more elaborate preparation than their commitment, application, and an independent mind" (Phillips, 1990).

In the book, Phillips (1990) discussed the fact that later in the seventeenth century, the view of women began to change. The belief that women were inferior because they were created from Adam's rib and that females were psychologically inadequate were researched and then disclaimed (Phillips, 1990). At this point, women gained more self-confidence and wanted more recognition (Phillips, 1990). During the seventeenth century, there was some scientific literature that interested women, which was another reason that women may have been interested in science (Phillips, 1990). Also, the amount of scientific books written concerning women also increased, and continued to increase into the eighteenth century.

In the nineteenth century, women seemed to become more accepted in scientific roles, and by the "middle of the nineteenth century, women were no longer content to be supplied with their science in a haphazard manner. They recognized that consistency and continuity were necessary" (Phillips 1990). This eventually led to the "University Extension." (Phillips, 1990). "The decision that ladies should be admitted on equal terms, both as proprietors and subscribers was taken at the second meeting of the managers convened on 23 March 1799 to discuss the constitution form and aims of the institution. Ladies were to be entitled to all the same privileges as the gentlemen members" (Phillips, 1990).

It was further explained by Phillips (1990) that in the middle 1960's girls' education had improved, women also "gained greater control over their lives," and that the careers women had once dreamed of were now available to them. On the other hand, "it is ironic, then, that it was these very improvements in the condition of women and the aspirations which they fueled that were eventually responsible for a decline of interest in science. As women set out on the road to equality, they resigned the scientific identity that had been there since the seventeenth century" (Phillips, 1990). This reveals some of the changes that had occurred at this time, and the effects that they had on the women involved in science. Even though it seemed that equality was the goal, it ended up that there were also negative aspects to the gain that women had created.

More recently, there has been a re-evaluation of the barriers and inequalities faced by women involved in science. Harriet Zuckerman, Jonathan R. Cole and John T. Bruer discussed four classes of explanations for gender inequalities in their book, *The Outer Circle: Women in the Scientific Community*. The four classes were:

"1. Gender differences in scientific ability
2. Gender differences in role performance and the allocation of resources and rewards
3. Gender differences arising from self-selection, including
    a.) marriage and motherhood and their consequences

b.) gender differences in career commitment
4. Outcomes of accumulation of advantage and disadvantage" (Zuckerman et al, 1991).

They further stated that differences in the careers of men and women are not affected by "differences in ability or competence" (Zuckerman et al, 1991). Differences in the employment of men and women can be seen in the areas of science and engineering. Zuckerman et al (1991) stated that women in these fields are "more often employed part time, less often looking for work, and out of work longer than men." Often times, women will explain these differences by the obligations that they feel for their families (Zuckerman et al, 1991). Further on this concept, it is often thought that marriage and having a family decreases the publications of a female scientist. Zuckerman et al (1991) stated that this is not true, and that "married women with PhD's in the sciences publish as much as single women, and having successive children is not associated with reduced rates of publication." The evidence stated here shows that many of the ideas of motherhood as well as marriage affecting the ability of women to pursue scientific interests are not true. Women produce as many publications whether married or single, but they are not always equal in employment opportunities.

Through the past few decades, women have become better represented in science, yet they are still separated in many aspects (Zuckerman et al, 1991). At the university level, women still only compose about twelve and a half percent of the senior faculty, and in the "top 90 U.S. research universities in 1995, less than 10% of senior faculty [in the natural sciences and engineering] were women" (Lawler, 1999). It has even been suggested by Andrew Lawler (1999) that even when women are successful in their scientific career, they are unhappy because they are not always included in activities that are seen by men as not for the women, and this unhappiness is also thought to be passed down to future potential women scientists. Zuckerman

et al (1991) believe that "if equality of encouragement and opportunity could be accomplished, a basis would be created for the legitimate review of women's performance."

When looking at the education of boys and girls, Constance Holden (2000) stated that "boys put more weight on 'theoretical' (interest in abstract thought such as that which goes on in engineering, physics, and math) and girls on 'social' (interest in people)." This would probably play a part in the careers that a female may choose. Further, with teenagers, it was stated by Jeffrey Mervis (1999) that "the image of a scientist or engineer as a geek, or a madman, is not an attractive one for most teenagers;" this could cause many teenagers to discount the idea of continuing in this type of career, due to the amount of peer pressure that affects this age group. Due to this, as well as other ideas about scientists, "retaining women and minorities who express interest in scientific careers is a big challenge" (Mervis, 1999). Even women who "succeed in academic science or engineering have more trouble than men do in finding satisfying and rewarding employment" (Eisenhart and Finkel, 1998). A concept that further discourages women from pursuing scientific careers is the fact that "median annual salaries for full-time employed civilian scientist and engineers are less for women at every level of experience, beginning with scientists and engineers employed less than five years" (Eisenhart and Finkel, 1998). All of these concepts play into the idea that fewer women participate in science. If these, as well as other factors affecting employment of women, were changed more women would probably be interested in pursuing scientific careers.

V. Conclusion

It has been clearly shown that women were not always as involved in science as they are today. Even today there are obvious differences between the treatment and beliefs of men versus

those of women. Today, it seems that the situations women face in scientific circles are much better than they once were, but these situations could still improve. It should also be made clear that the problems do not exist in all parts of the world, or in all laboratories. Just like anything else in society, some places are worse than others, which was discussed throughout this work. The beliefs that were conveyed created myths that seemed to have been difficult to disprove. Women were even thought to be inferior to men, not only in technique, but also knowledge and ability to think scientifically. It is sometimes difficult to understand the basis that would have been used to formulate these opinions.

In some areas of the world, women were thought highly of, even if there were other places that seemed to deny women the opportunity to even think. It was shown that even in a period when women were believed to be mentally incapable of learning science, there were places in the world where women were flourishing in the scientific world. This should have shown the rest of the world that it was possible for women to be active mentally and still maintain the ability to have a family, as well as take care of the family. Studies in the more recent past have shown that women with husbands and families do not seem to sacrifice scientific ability, or family duties and obligations.

Even though women have fought for equality, some women seem to regret it. Equality was the goal, but sometimes there need to be exceptions. Women are equal to men, but it must also be realized that there are differences between the two sexes. These differences do not suggest inferiority or superiority just that there are differences. Not everything can be completely the same for every person. Differences exist between each person, which require some amount of difference in treatment. Gender is just another difference that must be

considered when dealing with a person, just as some people think more logically than others, which may alter the way that a particular concept is explained.

Overall, the treatment of women has changed in a major way, but some of the irrational beliefs are still held. The ultimate goal should be that it would not matter whether a person is female or male, as well as what color their skin is, just whether or not they are able enough, devoted enough, and willing enough. Everyone should be given the same opportunities, but that will never be possible. The differences within a person is what makes them unique, therefore, differences should be seen as an advantage, a way to look at the same problem from a different perspective. These differences help to expand the possibilities and knowledge that can be gained from any one situation. Everyone should be allowed to pursue any vocation that interests him or her without the need for a struggle to succeed. If people allowed their minds to remain open and delay judgment until they have more information about a situation, many situations would probably have a more positive outcome. If society was more accepting, more advances in any are would probably occur at a faster rate, and everyone would benefit.

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